

Having thus, described the invention, what is claimed is:

1. A multi-cylinder internal combustion engine, comprising an engine block
2. having a plurality of oil galleries formed therein, an oil filter and an oil cooler operatively
3. attached to the engine block, and a balancer rotatably disposed within said engine block;
4. wherein said oil filter is attached to a side surface of said engine block;
5. wherein said oil cooler and said balancer are each respectively attached to a front
6. central portion of said multi-cylinder internal combustion engine;
7. said engine further comprising an oil pan and an oil pump for drawing oil from an oil
8. reservoir portion of the oil pan and for supplying the oil to individual portions of the internal
9. combustion engine after passing the oil through the oil filter and the oil cooler;
10. wherein said engine is configured so that oil from said oil cooler is introduced to a
11. substantially central part of a main oil gallery formed in said engine block.

1. 2. A multi-cylinder internal combustion engine as set forth in claim 1, further
2. comprising a crankshaft having a plurality of crankshaft webs, wherein said balancer
3. comprises a driven gear and wherein an intermediate crankshaft web of said crankshaft is

4 provided with a drive gear thereon; and wherein said drive gear on said crankshaft is meshed
5 with the driven gear of said balancer so as to thereby drive said balancer.

1 3. A multi-cylinder internal combustion engine as set forth in claim 1, wherein
2 said oil filter can be detached from said engine without interference from components of said
3 engine.

1 4. A multi-cylinder internal combustion engine as set forth in claim 1, wherein
2 said oil cooler improves oil flow throughout said engine so that oil pressure is uniform.

1 5. A multi-cylinder internal combustion engine as set forth in claim 1, wherein
2 said oil filter comprises an oil filter case and an oil filter element.

1 6. A multi-cylinder internal combustion engine as set forth in claim 1, wherein
2 said oil cooler and said balancer are so situated throughout said engine so as to maintain a
3 weight balance from left to right.

1 7. A multi-cylinder internal combustion engine as set forth in claim 1, wherein
2 said oil cooler is utilized with a water-cooled version of said engine, and wherein an
3 additional cooling effect is achieved by running airflow over said oil cooler when said
4 engine is moving through space.

1 8. A multi-cylinder internal combustion engine as set forth in claim 1, wherein
2 said engine comprises
3 a crankshaft comprising webs, and
4 bearings surrounding said crankshaft webs,
5 and wherein said oil cooler supplies oil, which is of uniform pressure and has a
6 cooling effect, to said bearings of said engine.

1 9. A multi-cylinder internal combustion engine as set forth in claim 8, wherein
2 said balancer is powered by driving mechanism which is narrower than one of said
3 crankshaft webs.

1 10. A multi-cylinder internal combustion engine as set forth in claim 1, wherein

2 said oil filter case is easily removable for ease of maintenance.

1 11. A multi-cylinder internal combustion engine as set forth in claim 1, wherein

2 said balancer is located near the gear drive assembly unit.

1 12. A multi-cylinder internal combustion engine as set forth in claim 1, wherein

2 said oil cooler is disposed at the front of said engine, so that said oil cooler is receptive of
3 moving airflow.

1 13. A multi-cylinder internal combustion engine as set forth in claim 1, wherein

2 said oil cooler is disposed centrally along said engine, so as to distribute oil evenly to said
3 engine internal components.

1 14. A multi-cylinder internal combustion engine adapted to be transversely mounted

2 in a vehicle frame, said engine comprising

3 an engine block having a front surface and having a plurality of oil galleries formed

4 therein;

5 a crankshaft disposed in the engine block and having a longitudinal axis which is

6 substantially parallel to the front surface of the engine block;

7 an oil cooler attached to the front surface of the engine block; and

8 a balancer rotatably disposed in the engine block and comprising a balance weight;

9 wherein the oil cooler and the balancer are respectively disposed proximate a

10 substantially central portion of the front surface of the engine block.

1 15. The internal combustion engine of claim 14, further comprising an oil filter

2 situated proximate the oil cooler and oriented substantially orthogonal thereto.

1 16. The internal combustion engine of claim 14, wherein the crankshaft has an

2 integral balancer drive gear thereon, and the balancer comprises a driven gear which is

3 enmeshed with said balancer drive gear.

1 17. The internal combustion engine of claim 14, wherein said engine comprises a

2 balancer support shaft which is supported and non-rotatably fixed onto an interior wall of the

3 engine block, and wherein said balancer is rotatably mounted on said balancer support shaft.

1 18. The internal combustion engine of claim 14, wherein the oil cooler is mounted

2 on the front side of an intermediate cylinder, and wherein the balancer is positioned on the

3 front side of another intermediate cylinder.

1 19. The internal combustion engine of claim 14, wherein said engine is configured so

2 that oil from said oil cooler is introduced to a substantially central part of a main oil gallery

3 formed in said engine block.

1 20. A motorcycle, comprising:

2 a frame, and

3 an internal combustion engine mounted transversely in said frame, wherein the

4 internal combustion engine is the engine of claim 14.